

this little known region, including notes on the mangrove trees and their influence on the coast line. The gold-field of Horn Island is described, the reefs occurring in porphyritic granite. The works are now abandoned, but apparently they were started before adequate investigations had been made, and even now it is doubtful whether the trials were exhaustive.

WE have received a copy of the illustrated catalogue of chemical apparatus and laboratory fittings supplied by Messrs. Max Kaehler and Martini, of Berlin, W. The catalogue runs to 500 pages, and will be sent post free to schools and colleges where there are chemical laboratories. The sole agent for the United Kingdom is Mr. S. Bornett, 62 King William Street, London, E.C.

PROF. WYNDHAM R. DUNSTAN, F.R.S., was recently appointed by the Board of Trade to be director of the Imperial Institute, and one of the results appears to be the publication, as a supplement to the *Board of Trade Journal*, of a "Bulletin of the Imperial Institute." The first issue of the bulletin contains much useful information as to the experiments and inquiries which have been carried out in the scientific and technical department of the Institute. Reports on the following investigations, amongst others, are included:—poisonous fodder plants and food grains; analyses and examinations of coal from Trinidad; kaolin from St. Vincent; tin ore from the Bautshi tin fields, Northern Nigeria; fibres from Sierra Leone and Brazil; and nuts from British Honduras and Portuguese East Africa. The second part of the bulletin consists of general notices prepared by the scientific department on a variety of questions, as different as the chemical analysis of gutta-percha as a guide to its cultivation and valuation, and cotton cultivation in Asia Minor. The work of the scientific and technical department is chiefly initiated by departments of the Governments of India and the Colonies. Arrangements have been also made by the Foreign Office whereby British Consuls may transmit for investigation such natural products of the countries in which they are appointed to reside as are likely to be of use to British manufacturers and merchants. Materials are first chemically investigated in the laboratories of the department, which includes a staff of skilled assistants, and are afterwards submitted to technical trials by experts, and finally are commercially valued. Manufacturers, and dealers in natural products, ought to be keenly alive to the advantages to be derived from work and inquiries of this character.

THE additions to the Zoological Society's Gardens during the past week include an Indian Elephant (*Elephas indicus*, ♀) from India, presented by the Maharaja of Benares; a Mozambique Monkey (*Cercopithecus pygerythrus*) from East Africa, presented by Mr. J. R. E. Stansfeld, D.S.O.; a Crested Porcupine (*Hystrix cristata*), a Black-backed Jackal (*Canis mesomelas*), a Puff Adder (*Bitis arietans*), a Cape Bucephalus (*Dispholidus typus*), a Smooth-bellied Snake (*Homalosoma lutrix*) from South Africa, presented by Mr. Barry McMillan; two Puff Adders (*Bitis arietans*) from South Africa, presented by Mr. A. W. Guthrie; two Black Lemurs (*Lemur macaco*) from Madagascar, a New Zealand Owl (*Ninox novae-seelandiae*), four Variegated Sheldrakes (*Tadorna variegata*) from New Zealand, five Nutmeg Fruit Pigeons (*Myristicivora bicolor*) from Moluccas, six Nicobar Pigeons (*Caloenas nicobarica*) from the Indian Archipelago, a Glossy Calornis (*Calornis chalybeus*), a Hamadryad (*Naia bungurus*) from India, seven Large Andaman Parrakeets (*Palaeornis magnirostris*), an Andaman Starling (*Poliopsar andamanensis*), six Andaman Teal (*Querquedula albigularis*) from the Andaman

Islands, two Canadian Cranes (*Grus canadensis*), four Prickly Trionyx (*Trionyx spinifer*) from North America, four Ceylonese Terrapins (*Nicoria trijuga*) from Ceylon, two Adanson's Sternotheres (*Sternotherus adansonii*) from West Africa, deposited; a Brush Turkey (*Talegalla lathamii*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JULY:—

1. 10h. 40m. Minimum of Algol (β Persei).
- 5-6. Venus very near Regulus (α Leonis).
9. 8h. 4m. to 9h. 11m. Moon occults ρ' Sagittarii (mag. 3.9).
- 15h. Venus at greatest elongation, $45^{\circ} 30'$ E.
15. Venus. Illuminated portion of disc = 0.459 of Mars = 0.873.
20. 13h. 56m. Moon in conjunction with Aldebaran (α Tauri).
21. 12h. 23m. Minimum of Algol (β Persei).
23. Mars $1\frac{1}{2}^{\circ}$ N. of Spica (α Virginis).
24. 9h. 12m. Minimum of Algol (β Persei).
26. 8h. Moon in conjunction with Pallas. Pallas $0^{\circ} 47'$ N.
29. 20h. Saturn in opposition to the sun.
30. Uranus $\frac{1}{2}^{\circ}$ N. of 51 Ophiuchi (mag. 4.9).

NEW COMET, 1903 c.—A Kiel Centralstelle telegram announces that M. Borely, observing at Marseilles, discovered a new comet, 1903 c, on June 21. Its position for 11h. 36.5m. (M.T. Marseilles) on June 21 was

R.A. = 21h. 52m. 52s., Dec. = $8^{\circ} 10'$ south,

and its daily movements in R.A. and Declination are $-28s.$ and $+44'$ respectively.

The telegram states that a nucleus and a tail have been observed, but it does not state the magnitude of the object.

A later telegram states that Herr Wirtz, Strasburg, observed this comet at 22h. 8.8m. (M.T. Strasburg) on June 22, and determined its position as follows:—

R.A. = 21h. 51m. 53.73s.
Dec. = $7^{\circ} 17' 11''$ south.

PHOTOGRAPHIC OBSERVATIONS OF COMET 1902 III.—Prof. Sykora, of Jurjew, has communicated to No. 3871 of the *Astronomische Nachrichten* the results of the photographic observations of Comet 1902 iii. made by him during September and October of last year.

Reproductions of drawings made from the photographs show that on September 26 the comet possessed two tails of Bredichin's second and third types respectively, and the measurements showed that the longer tail was about 2° in length. On October 7 this length was increased to 3° , and the tail was more like Bredichin's first type, whilst the shorter third-type tail had decreased in length. On the photograph taken on October 9 this difference was further accentuated.

THE MIRROR OF THE CROSSLEY REFLECTOR.—Dr. G. Johnstone Stoney writes to correct a misapprehension referring to the mirror of the Crossley reflector in use at the Lick Observatory. The figuring of this mirror is usually attributed to the late Dr. Common, and has been ascribed to him in these columns (pp. 132, 162). It appears, however, from a correspondence between Mr. J. Gledhill and Prof. Campbell that Mr. Crossley's gift to the Lick Observatory included two mirrors, described as A and B, essentially of the same diameter and focal length. One of these, B, was refigured by Sir Howard Grubb, and was sent to America as it came from his workshop. "It is the B mirror," Prof. Campbell states, "which has been used in all the work with the Crossley Reflector at the Lick Observatory." Dr. Stoney adds:—"In any enumeration of noteworthy instruments made by Dr. Common, it would appear desirable to include the very remarkable flat mirrors of large size which he produced of late years, some of them for the cœlostats of the Joint Solar Eclipse Committee of the Royal and Royal Astronomical Societies. The production of

optically flat mirrors of such size and so great perfection was a very great achievement."

RADIANT POINTS OF JULY AND AUGUST METEORS.—A paper by Mr. Denning in No. 3874 of the *Astronomische Nachrichten* describes the meteor showers which occur about the same time of the year as the splendid Perseid shower, and it gives, in tabular form, the radiant points of more than one hundred showers that have been observed at Bristol, during 1876–1902, in the months of July and August, dividing the epochs of appearance into three periods, viz. July 6–16, July 20–August 16, and August 19–25. Many of the displays are feeble, and a prominent feature of these is that they appear for a long period from the same fixed radiant.

The Perseid swarm varies greatly in intensity; at some apparitions as many as 150 to 200 shooting stars are observed per hour, whereas at other appearances the hourly rate may decline to 20 or 30. From a careful survey of the records, Mr. Denning thinks that there is evidence of this shower having a periodicity of between 104 and 123 years. The maximum is now reached on the morning of August 12 or 13.

SUN-SPOTS AND TERRESTRIAL TEMPERATURE.—In discussing the statement recently made by M. C. Nordmann in its application to the temperatures observed at the Jacob camp (Guadeloupe), M. Alfred Angot finds that approximately the same law holds good, and may be represented by the formula

$$t = t_0 + ar,$$

where t is the actual temperature, r is Wolf's frequency number, and t_0 and a are constants for each station, a being a negative quantity. On calculating the temperatures for the Jacob station from this formula, first determining the constants for that place, it is found that they vary but slightly from the observed values, the mean variation being $\pm 0.06^\circ \text{C.}$, and M. Angot suggests that an analysis of the annual variations at a number of stations might reveal the presence of further periodical variations (*Comptes rendus*, No. 21).

THE SATELLITES OF SATURN.—*Bulletin* No. 34 of the Lick Observatory contains the results of a second series of observations of the satellites of Saturn made by Mr. W. J. Hussey of that observatory.

Mr. Hussey measured the position angles and distances of each satellite in respect to one of the others, and gives a table containing all the details of each observation; he concludes from estimations of their respective light values that Mimas is probably larger than Hyperion, and, from his measurements, that the generally accepted diameter of Titan is undoubtedly too large; 2500 miles is, according to him, a much nearer approximation to the true value than the values given in most text-books.

THE ROYAL SOCIETY CONVERSAZIONE.

MANY of the objects on view at the Royal Society conversazione on Friday last were shown at the gentlemen's conversazione held on May 15, and have already been described in these columns (p. 59). There was, however, a number of additional exhibits illustrating methods and results of recent work in many branches of science, and these are mentioned below.

The condensation of the radio-active emanations of radium and thorium by liquid air formed the subject of an exhibit by Prof. E. Rutherford, F.R.S., and Mr. F. Soddy. The radio-active emanations of thorium and radium appear to be the residues of the thorium atom and radium atom respectively after the heavy positively charged particles, known as the " α rays," have been projected. They have all the properties of inert gases of the argon family, and diffuse away from the radium and thorium compounds producing them. They can be condensed at the temperature of liquid air, and are again volatilised on raising the temperature. Their actual quantity is almost infinitesimally small, being quite invisible and unweighable, but their presence can be detected by their property of radio-activity.

A method for the rapid determination of the specific gravity of blood, taken from a single drop, was shown by Prof. W. J. Sollas, F.R.S. A fluid heavier than the blood (chloroform and benzole sp. gr. 1.07), and another lighter (benzole and chloroform sp. gr. 1.04), are introduced into a tube, the heavier first, so that the lighter, added subsequently, floats upon it. The two fluids mix by diffusion so as to produce a column in which the specific gravity varies continuously from a higher to a lower value upwards. A drop of blood obtained from a pin prick is then added, and sinks in the column until it reaches a level where the specific gravity is identical with its own. Two glass floats of known specific gravity are now introduced, one of higher and the other of lower specific gravity than the blood. The distances of these, when floating in the column, from the drop of blood are proportional to the difference in specific gravity.

Mr. J. Y. Buchanan, F.R.S., exhibited a copper sphere and brass tube in illustration of an effect produced by the momentary relief of great pressure. Experiments were made during the cruise of the *Challenger* and on board the *Princess Alice*. The copper sphere contained a glass spherical flask of about $1\frac{1}{2}$ inches in diameter hermetically sealed, and the sea water had free access through the two holes at the poles. The brass tube contained a glass tube of 50 cubic centimetres in capacity, hermetically sealed, and the sea water had free access at both ends of the brass tube. The brass tube was sent to a depth of 3000 metres, and at some, probably less, depth the internal glass tube gave way to the pressure and collapsed suddenly. The enclosing brass tube was pinched up by the external pressure. The experiment shows that, in the time, it was easier to pinch the envelope of brass than to shove in the plugs of water at both ends. The copper sphere was sent first to 3000 metres, but was pulled up without showing any effect. It was then sent to 6000 metres, and the internal glass flask collapsed at some depth between 3000 and 6000 metres, and the creasing which is visible on the copper sphere was produced. These experiments, whether made with the copper ball or with the brass tube, furnish striking demonstrations of the importance of the element of *time* in all physical considerations.

Photographs of the paths of aerial gliders were shown by Prof. G. H. Bryan, F.R.S., and Mr. W. E. Williams. These photographs were taken by attaching a piece of magnesium wire to gliders of cardboard, and show the path taken during their descent through the air. By fixing a rotating wheel in front of the camera so as to give a series of exposures instead of a continuous exposure, dotted traces were obtained, the distance between the dots enabling the velocity at different points to be compared.

The solar disc in monochromatic (κ) light was exhibited by the Solar Physics Observatory, South Kensington. The glass positive and negative shown was a specimen of one of the trial plates taken for adjustment of the new photo-spectroheliograph. Large belts of prominences could be seen stretching across the solar disc.

The Solar Physics Observatory also exhibited photographs of the spectrum of lightning. The spectra were secured by Dr. William J. S. Lockyer on the early morning of May 31. Small cameras were employed fitted with Thorpe's transparent gratings in front of the lenses.

A reproduction of the hydraulic organ of the ancients was shown by Mr. John W. Warman. This instrument, originally invented by Archimedes about 250 B.C., has furnished a problem for at least 600 years, and has been the subject of endless speculation. The only real difference between the hydraulic and the ordinary or "pneumatic" organ is that, in the former, the wind-pressure is derived from the weight of an annular mass of water, instead of from the loaded top of a folded air-bellows.

Mr. W. N. Shaw, F.R.S., had on view the July number of the *Monthly Pilot Charts* of the North Atlantic and Mediterranean, issued by the Meteorological Council. The chart was exhibited to show the modifications introduced since the commencement of the series in April, 1901.

Bactericidal emanations from radium were demonstrated by Mr. Henry Crookes, who also showed photographs of a box of instruments, (a) taken by ordinary Röntgen rays, (b) taken by radium emanations at a distance of eighteen inches.